ENTOMOLOGICAL NEWS

OCTOBER, 1937

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ENTOMOLOGICAL NEWS

VOL. XLVIII. OCTOBER, 1937 No. 8

Colonial Habits of Certain Caterpillars. (Lepid.: Notodontidae).

By C. BROOKE WORTH, M.D., Swarthmore College, Swarthmore, Pa.

Packard,[1] in his monograph on the Bombycine moths, sets forth the theory that hairy, arboreal caterpillers have evolved from smooth, ground- or shrub-dwelling, ancestral forms. That author was equipped to formulate hypotheses; this one is not, for I am not a lepidopterist or even an entomologist.

This morning, however, I happened to discover a colony of larvae which were subsequently identified at the Academy of Natural Sciences of Philadelphia as *Datana integrerrima,* and their colonial habit was so remarkable that I determined to record my observations and impressions.

The colony, consisting of about 200 individuals, was situated in a young walnut tree, and the larvae were just completing their final moult. They had congregated in a cluster underneath a branch of the tree. A small amount of silk had been spun to anchor them to the branch, and from this they depended as an irregularly globular mass. A few of the caterpillars nearest the branch were holding on to the bark, as if to reinforce the inadequate silk anchor. The chief number of larvae, however, reposed in the hanging globe; this resembled an inert body measuring 8 in. x 4 in. x 3 in. which, when touched, transformed itself into a writhing aggregate of furry worms.

The larvae were just casting off their skins. A fly, one of the *Tachinidae,* buzzed about, surveying the moult with pregnant anticipation. As each skin was shed, the fly would promply deposit 5 or 6 eggs on the caterpillar's soft head. In an hour or two the head, red at first, became black and hard. A female Ichneumon fly (*Ichneumonoidea*) also stood guard, but I did not see it use its spear-like ovipositor.

[1] Packard, 1895. Bombycine Moths. Mem. Nat. Acad. Sci. Vol. 7.

So much for observation. From the layman's point of view I inferred that the colonial habit of *D. integerrima* larvae is a definite assurance for their perpetuation. The protection afforded is not, however, of the utmost efficiency. Let us suppose that the original caterpillars which adapted themselves to arboreal life and developed hairs were not colonial—since colonial life always indicates specialization. They would, in spite of the hairs, be vulnerable to the attacks of parasitic insects, particularly when moulting. Then let us suppose that they began to congregate at moulting time, purely by chance. In forming a globular mass, they would still present numerous vulnerable individuals on the surface of the globe, but the ones in the interior would be protected. This would be a wasteful method, as it would sacrifice a large proportion of the colony for the sake of a small, favored portion; however the slaughter among non-colonial forms of caterpillars is equally great, if not greater, so that the society of *D. integerrima* and the like would function on a definite survival coefficient or pattern.

In calculating the protective-efficiency index of this form of colonial life in a very rough way, let us assume that the sphere contains 200 cubic units (i.e., caterpillars), not taking into account that the caterpillar's shape is cylindrical rather than cubical. Since the volume equals $4/3 \times \pi \times R^3$, we can arrive at the area in "square caterpillars" as follows:

Volume (Cubic Caterpillars) equals $4/3\ \pi R^3$

R equals 3.6 (Linear Caterpillars).

Area (Square Caterpillars) equals $4 \times \pi \times R^2$

Area equals 163 (Square Caterpillars).

Thus, in a colony of 200 larvae, 163, or over three-quarters of them, will be exposed on the surface to parasitic invasion, and the protective-efficiency index of the spherical habit of congregation will be such that only 1 in 5 individuals will be protected (18½% by this crude method).

By one more geometrical step it can be inferred that the size of the colony will increase through the evolutionary period, and thus the complexity of colonial adaptation will be gradually enhanced. For the larger the sphere, the smaller will be the

relative number of surface individuals. For example, consider a colony twice as large, containing 400 larvae. By similar calculations one finds that the area equals 276 "square caterpillars," and the protective-efficiency index becomes 1 in 3 (31% protected). Thus a greater number of healthy larvae—not only in absolute units, but also in proportion to the initial population—would mature from the large colony. Hence an evolutionary factor would be introduced concerning the number of eggs laid by the mature female moths, or else concerning the laying of eggs by several moths in a spot where the future colonies could coalesce.

But since the larvae at the center of the ball were the ones destined to propagate the race, it would follow that with each succeeding generation the larval balls would be formed more compactly, each individual seeking by inherited instinct to gain the most central position. Indeed such a result was evident in the colony which I saw today, for the caterpillars were so thickly clustered that very few were left to grasp the branch, and they all seemed in imminent danger of falling to the ground. Thus a physical limit has been set to the size of the colony and of the sphere.

A refinement of this crude colonial form—if I may suggest that two such isolated phenomena can be regarded as parts of a sequence—is found in the tent caterpillar group (Lasiocampidae). Here clustering is also the rule, during the moult and between foragings. But in this case the silken support has been perfected as a mechanical device; it has also been extended to form an actual protection around the cluster. The *D. integerrima* colony presents a furry surface, the individual larval hairs being analagous in point of function to the tent or nest of the tent caterpillars, but not nearly so efficient.

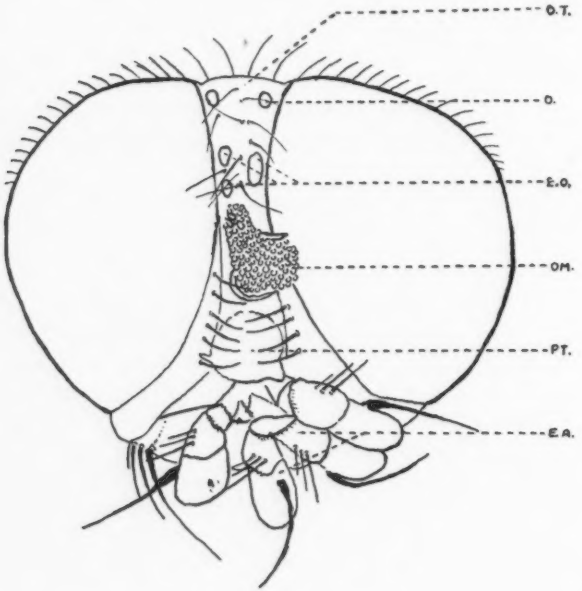
I therefore have the temerity to suggest an extension of Packard's evolutionary thesis: that colonial caterpillars evolved from solitary arboreal forms whose hairs did not constitute adequate protection from insect parasites; that in *D. integerrima* we see an early, inefficient colonial habit; and that among the tent caterpillars we find the perfected mechanism.

An Abnormal Specimen of Hylemyia hinei Malloch with Notes on Synonymy and Distribution (Diptera, Muscidae).

By Fred M. Snyder, University of Wisconsin, Madison.

References to Muscidae having an abnormal number of ocelli and antennae are very few. The occurrence of such a fly, especially when it is a little-known species, may be of interest.

The specimen, a male, was captured on willow catkins (*Salix discolor* Muhl.), May 5, 1936, at Madison, Wisconsin. Figure 1 is a fronto-dorsal view of the head of this fly. There are several remarkable abnormalties. Inserted between the normal pair of antennae is an extra pair (E.A.). The normal number



of ocelli is three. In this particular specimen the usual two

posterior ones (0) are present but instead of the usual median anterior ocellus there are three extra lateral ones (O.E.), two upon the right side, and one upon the left side. The shape and position of this latter ocellus might suggest that it is a fusion of two as appear on the right side. Running from near the most anterior right ocellus to the facial plate is a mass of small lenses which are either a group of extra ocelli or ommatidia (OM). Whether or not this represents ocelli or the rudiment of a median third compound eye, is impossible to say. The specimen is somewhat teneral and the ptilinum (PT) is still extruded. In normal specimens the eyes are separated by the width of the anterior ocellus. The ocellar triangle (OC) in this specimen is greatly elongated to accommodate the extra ocelli and the eyes are widely separated. In general the head is slightly asymetric due to the extra organs which are present. The rest of the body together with the bristling is normal in all respects.

The writer is indebted to Dr. H. C. Huckett for the following synonomy, *Hylemyia ithacensis* Huckett = *Hylemyia hinei* Malloch.

Hylemyia hinei Malloch[1] was originally described from Savonski, Naknek Lake, Alaska, from material collected by J. S. Hine. Huckett[2] redescribed this species from Ithaca, New York, as *Hylemyia ithacensis*. The excellent figures of the very characteristic male genitalia given by Huckett makes identification of this species easy. This species was quite common around Madison, Wisconsin, from April 29 to May 24, 1936; a few were also taken during May in 1935. Extensive collecting later in the year did not again yield this species.

The males were taken very commonly on rocks and leaves of low-growing bushes, especially during the sunny late afternoons. Females were less numerous and were collected only on willow catkins, as were a few males.

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[1] Malloch, J. R. Ohio Jr. Sci. xx, p. 278, 1920.
[2] Huckett, H. C. Cornell Univ. Ag. Expt. Sta., Mem. 77, p. 28, 1924.

Insect Stamps.

By B. Elwood Montgomery, Purdue University, Lafayette, Indiana.

(Continued from page 186*).

To my mind the most beautiful of all insect stamps is the Lebanon sericultural issue. This series, consisting of six stamps of identical design, was issued in connection with a "Congrès Sericicole" at Beyrouth in 1930. The six values (4, 4½, 7½, 10, 15 and 25 piastres) are printed in rather bright colors—black brown, vermillion, dark blue, dark violet, dark green and claret, respectively. The design consists of a larva, a cocoon and a moth of the silkworm and a (mulberry?) twig, bearing two leaves. The moth and larva are on the leaves and the cocoon is attached to the twig by a number of fine lines (which represent the veins of leaves otherwise consumed?). The caterpillar is apparently full grown but the leaves show no sign of having been fed upon.

The Japanese have long loved the dragonfly, because, it is said, an emperor viewing his kingdom from the summit of Fuji-yama compared it to a dragonfly with outspread wings. Since that time much folklore has grown up around this insect in Japan, and "The Land of the Dragonfly" has used a design of its revered namesake on an issue of stamps. This issue, used in 1923, included two values (10 and 20 sen), which are deep brown and deep blue, respectively. The figure of a dragonfly appears at either end of a bar carrying figures and letters indicating the value. The wings of the near side only are shown; as is usual in artists' designs of insect wings the venation vaguely resembles that of a leaf.

Three Dutch colonies, Curacao, Surinam, and "Nederlandsch Indie" used a series of stamps with figures of a moth in the design from 1902 to 1909. A sphinx moth is shown in each of the four triangular spandrels surrounding the circular medal-

* Omitted by oversight at the end of the second paragraph on page 186.—Ed.

lion of the stamp. The design was used for all values from 10 to 50 cents. The issue included six, eight and 41 varieties for the three colonies, respectively. The stamps are printed in many colors and shades; a few are bi-colored. The design is supposed to have been adopted for the Dutch Indies "on account of the fact that at least one of the islands is noted for its beautiful moths." The same design may have been furnished to the American colonies to save the expense of making new dies.

Where and When to find the Orthoptera of Pennsylvania, With Notes on the Species Which In Distribution Reach Nearest This State.

By Morgan Hebard, Philadelphia, Pennsylvania.

In Pennsylvania 133 species and 4 races of Orthoptera are known and 16 species and 1 race in addition should be found, which brings the total to 154. There are also 7 introduced and established species and 1 other such which should be found, making in all 162 species and races. A single native species of the Dermaptera should be found and there is one introduced and established species.

Considering New Jersey, its coastal and Pine Barrens fauna includes 1 additional species of Dermaptera, 23 species and 2 races of Orthoptera, and there are also 1 northern and 2 introduced species of the latter, this equalling 28 species and races or a total for Pennsylvania and New Jersey of 190.

I am particularly indebted to Dr. H. Fox and Mr. E. S. Thomas for their aid in checking the approach toward Pennsylvania of species from New Jersey and Ohio respectively and other assistance has been rendered by James A. G. Rehn, A. B. Gurney, W. T. Davis, H. R. Roberts and T. H. Hubbell.

The work has been done to aid those interested in collecting Orthoptera in Pennsylvania. Large and important areas in the State are very poorly known from this angle and field work will undoubtedly provide much interesting and more exact data on many species. Few, if any, new species are, however, to be expected.

DERMAPTERA.

LABIIDAE.

Though *Vostox brunneipennis* (Serville) was described from Pennsylvania and later reported from Maine and New Jersey, these records are all almost certainly erroneous. The northeasternmost authentic record for this southern species is Wingina, Virginia. It lives largely under dead bark in a slightly moist immediate environment.

LABIA MINOR (Linnaeus). Introduced from Europe and now established, widespread and common in Pennsylvania. Most liable to be found in manure piles. Flies about at twilight on warm evenings. Appears adult in Spring.

Although not as yet known from the State, *Doru aculeatum aculeatum* (Scudder) should be found in extreme southeastern Pennsylvania as I have specimens from Edgewood, Maryland, only twenty miles south of the state line and it is known on the coast from Snake Hill near Jersey City, New Jersey, and Bayside, Long Island, New York. It lives in the sheaths of sedges and tall marsh grasses and appears adult in late summer, hibernating in soft debris until spring.

ORTHOPTERA.

BLATTIDAE.

BLATTELLA GERMANICA (Linnaeus). Introduced from Europe. Now established, widespread and very common, particularly in old houses along plumbing. Domiciliary throughout Pennsylvania. Present adult throughout the year.

ISCHNOPTERA DEROPELTIFORMIS (Brunner). Confined to the lowlands of southern Pennsylvania where it is rare. Northern limits are West Creek and Riverton, New Jersey, and Wayne, Linglestown and Charter Oak (material examined), Pennsylvania. Terrestrial and found near or in open woods under litter, most frequently in damp places. Appears adult in early June.

PARCOBLATTA VIRGINICA (Brunner). Common throughout Pennsylvania. Sylvan, found under leaves and dead bark during the day. Males are sometimes attracted to light at night, females best secured by means of molasses traps. Appears adult in late May.

P. UHLERIANA (Saussure). Same as the last species but less abundant in the boreal areas.

P. DIVISA (Saussure and Zehntner). A woodland species, very rare and probably confined to the southeastern portion of the State. Northern limits Anglesea and Wildwood Junction, New Jersey, and Swarthmore, Pennsylvania (a single male from the latter locality). Appears adult in early June.

P. PENSYLVANICA (DeGeer). Present throughout the woodlands of Pennsylvania but usually scarce. Appears adult in late May.

PERIPLANETA AMERICANA (Linnaeus). An established adventive from the Old World. Domiciliary. Occurs throughout Pennsylvania, particularly in cities.

P. AUSTRALASIAE (Fabricius). Adventive from the Old World and only occasionally found in this latitude as it prefers subtropical and tropical regions. Was (probably temporarily) established in a greenhouse at Radnor, Pennsylvania.

BLATTA ORIENTALIS (Linnaeus). Introduced from the Old World and now extensively established in temperate and subtropical North America. Often very abundant indoors in Pennsylvania, particularly in old city houses. Adults sometimes appear in great numbers in Philadelphia, in May.

PYCNOSCELUS SURINAMENSIS (Linnaeus). A tropical adventive which in this latitude becomes established only indoors. Occurs infrequently in greenhouses (North Wales, Penna., v, 7, 1925, C. Doucette) and zoological gardens. Parthenogenetic in America.

CRYPTOCERCUS PUNCTULATUS Scudder. Originally recorded from Pennsylvania and since reported only from Pittsburg but probably present throughout the mountains of the State as it is known north to southwestern New York. May be extremely local. Lives in burrows in damp decaying sapwood of logs, usually chestnut or pine. Present adult in May.

MANTIDAE.

STAGMOMANTIS CAROLINA (Johannson). Rockville, Pennsylvania, x, 12, 1912, (J. A. Good), 1 ♂, [Pa. Bureau of Plant Industry]. An immature female from Chestertown, Maryland,

in the Academy collection affords a northeastern limital point of distribution. Appears adult in the fall.

TENODERA ANGUSTIPENNIS Saussure. Introduced from Asia in northern Delaware and now known from adjacent New Jersey and Maryland, this species will probably spread into extreme southeastern Pennsylvania if it has not already done so. It appears adult late in summer.

T. SINENSIS Saussure. Introduced from Asia in Philadelphia, this species is now common in southeastern Pennsylvania and is known up the Delaware River as far as Trenton. It appears adult late in the season and is best located on hedges and bushes on warm fall days.

PHASMIDAE.

DIAPHEROMERA BLATCHLEYI ATLANTICA (Davis). Rare and in Pennsylvania confined to the southeastern lowlands, this interesting and apparently parthenogenetic species is represented in the series before me by material from the vicinity of Philadelphia, Swarthmore, Malvern and Pottstown. Appears adult in late July.

D. FEMORATA (Say). Present throughout Pennsylvania. Arboreal, preferring oak and wild cherry. Becomes adult in the late summer and though usually decidedly scarce, sometimes appears locally in large numbers and has been known to defoliate trees and bushes. When cooler days come this insect is inclined to wander about and is then more apt to be noticed.

ACRIDIDAE.

ACRYDIINAE.

NOMOTETTIX CRISTATUS CRISTATUS (Scudder). Present in northern portions and mountains of Pennsylvania. Found locally in small numbers in open woodlands and sometimes in pastures. Adults present in spring, summer and fall.

NOMOTETTIX CRISTATUS COMPRESSUS (Morse). Found in southeastern Pennsylvania. A less boreal race of similar habits. Sometimes locally abundant.

ACRYDIUM SUBULATUM (Linnaeus). Probably present throughout the colder sections of the State, elsewhere very

local and confined to boreal spots. Abundant in the marshes at Tinicum Island in southeastern Pennsylvania; this and Hancock's Bridge, New Jersey, are southern limits on the Atlantic Coast. Prefers damp spots in fields, marsh areas and moist swales. Appears adult in late summer, some early in the spring.

A. ACADICUM ACADICUM (Scudder). Also a boreal insect but probably often numerous locally throughout Pennsylvania. Prefers grassy hillsides in the open. Present adult through spring, summer and fall.

A. ORNATUM (Say). Generally distributed in Pennsylvania except in the most boreal areas. Often extremely abundant and present adult throughout spring, summer and fall. Prefers open areas of short grass and occurs both in dry and moist environment.

A. ARENOSUM ANGUSTUM (Hancock). Locally exceedingly abundant except in the more boreal portions of Pennsylvania, preferring damp sandy soil and particularly bare sand along streams. Present adult through summer and fall.

NEOTETTIX FEMORATUS (Scudder). Very rare in Pennsylvania and known only from the southeastern portion at Willow Grove and Pink Hill, other northern limits on the Atlantic Coast being Milltown, New Jersey, and Staten Island, New York. Found in areas of poor soil on dry hillsides in moist spots, on sand, etc. Appears adult in late May.

PARATETTIX CUCULLATUS CUCULLATUS (Burmeister). Found throughout Pennsylvania and locally sometimes exceedingly abundant on bare sands along streams particularly in the most autsral portions of the State. Appears adult in late May.

TETTIGIDEA LATERALIS PARVIPENNIS (Harris). Moderately numerous probably throughout Pennsylvania and adult from spring to late fall. Prefers richer grasses than the other Grouse Locusts, but is found in a great variety of environment, forest undergrowth, meadows, roadsides, etc.

Although *Tettigidea armata* Morse is not yet known from Pennsylvania, it should be sought in wet spots in woodland undergrowth, particularly along streams, in the southeastern portion of the State. Though widespread in the South, it is

coastal this far north as far as Staten Island, New York. A very local insect, which is present adult in the spring, summer and fall.

ACRIDINAE.

PSEUDOPOMALA BRACHYPTERA (Scudder). Extremely local and usually very scarce this far south, this handsome species is yet known only from two serpentine outcrops in the extreme southeastern portion of Pennsylvania, though it should be sought in favorable local environment throughout the lowlands. It prefers dry areas of poor soil with bunch grass, *Andropogon* sp. Appears adult early in July.

METALEPTA BREVICORNIS (Johannson).[1] Known only from Goshen and Harrisburg and probably restricted to southeastern Pennsylvania. There undoubtedly present in the lower Delaware Valley as it is known from localities on the New Jersey side. Peculiar to tall grasses and sedges near water and in swamp areas. Appears adult in late July.

SYRBULA ADMIRABILIS (Uhler). Undoubtedly very scarce and local as far north as the lowlands of southern Pennsylvania. Material is before me from Fairmount Park in Philadelphia, and Glenolden in the southeastern and Washington in the southwestern section of the State. Prefers grasses in dry areas. waste places and open woodlands. Appears adult in mid-July.

ERITETTIX SIMPLEX SIMPLEX Scudder. Scarce and very local but probably present through all but the Canadian Zone of Pennsylvania though as yet known only from Kintnersville (Fox in litt.) and the southeastern portion where it is confined to grassy areas on poor soil. Appears adult early in May.

ORPHULELLA SPECIOSA (Scudder). A common species preferring short grass in dry open environment throughout Pennsylvania. Appears adult early in July.

O. PELIDNA (Burmeister). A species which should be found throughout Pennsylvania but which apparently is very seldom seen. Prefers *Andropogon* in fields and open woodland grasses. Appears adult early in July. Only Pennsylvania records are Perkasie, Bartram's Garden, Mount Airy and Pink Hill, all southeastern.

[1] This species has been referred to the genus *Truxalis* for many years.

DICHROMORPHA VIRIDIS (Scudder). Common in lush weeds and grass throughout Pennsylvania except in the coldest areas, but like most other Orthoptera rarely present in the rich grass pastures near Philadelphia. Appears adult early in July. The rare macropterous phase is not yet known from this State.

CHLOEALTIS CONSPERSA Harris. Prefers woodland grasses in a dry environment. Probably present throughout Pennsylvania but much more numerous in the mountains and hills and limited to the colder spots in the warmer portions of the State. Appears adult in early July.

CHORTHIPPUS LONGICORNIS (Latreille). Very common locally in the higher grasses of moist areas in the Pennsylvania mountains, in upland bogs and in the Delaware River marshes. Known southeast to Essington and Fern Hill. Appears adult in June.

As *Stethophyma platyptera* (Scudder) has been taken from Thompson, Connecticut, to Lane, South Carolina, it should certainly be sought in the bogs of Pennsylvania, particularly in the more austral areas. In the east it is one of the most striking and rare of the grasshoppers. It is now known to be a decidedly less boreal species than the two other North American members of the genus. It should appear adult in Pennsylvania in late June.

STETHOPHYMA LINEATUM (Scudder). Known only from Lopez and Tinicum Island, the distribution of this boreal species, though highly discontinuous, probably includes all of the State. A southeastern limit is Hancock's Bridge in southern New Jersey. Peculiar to marsh grasses the insect, when once found, may be present in large numbers or very scarce in exceedingly restricted areas. One such on Tinicum Island appeared to be about a hundred yards in width, the similar surrounding marsh being uninhabited by the species. It appears adult in late June.

(To be continued)

Life History of the Wheel-Bug, Arilus cristatus (Linn.) (Hemiptera: Reduviidae).*

By J. N. Todd, Entomology Division, S. C. Experiment Station, Clemson, South Carolina.

The Wheel-bug was more abundant than usual in the vicinity of Clemson College during the fall of 1934. On the afternoon of November 14 two fresh egg masses along with numbers of the adults were collected. After determining that very little was known regarding this insect, it was decided to conduct a detailed study of its life history.

The eggs were kept in a screened cage in the screened portion of the experiment station insectary under conditions which were practically the same as outdoors and were examined at regular intervals throughout the winter. During hatching, the insects appearing on a certain day were transferred to petri dishes which were used for life history cages. Filter papers were placed in the bottom of the petri dishes to facilitate cleaning. A few stems of alfalfa were kept in the cages to maintain adequate humidity and to serve as food for the insects supplied as prey for the wheel-bugs.

Most of the insects that were used as food for rearing were collected from alfalfa with a sweep net. During the first instar, aphids and garden flea hoppers from alfalfa were the principal food. As the nymphs increased in size, larger insects were placed in the cages. Many species of common grasshoppers, several species of curculios, several species of blister beetles, numerous species of lepidopterous larva, and the Mexican bean beetle as both larva and adults constituted the major portion of the food. Some nymphs while molting were destroyed by grasshoppers, so it was necessary to paralyze all grasshoppers before placing them in the life history cages. The cages were checked each day and any individual that had molted during the intervening period noted. During the first instars, several nymphs were kept in the same cage and transferred only after

* This paper is Technical Contribution No. 44 from the South Carolina Experiment Station.

molts. As the third instar was attained individual cages were provided. The cages were cleaned and the food replenished as needed.

The first eggs were noted hatching April 12 and the last April 19, 1935. A period of exceptionally cold weather caused all the insects hatched the first four days to die. The first instar nymphs were sticky, so much so that it was almost impossible to transfer them from one cage to another without injury. This condition became less noticeable as the individuals molted and was lost entirely after the second instar.

As revealed by the present study *Arilus cristatus* (Linn.), passes through five nymphal instars. There is only one generation per year in the locality of Clemson College, S. C., and the winter is passed in the egg stage. The duration of each stage is given in Table 1.

TABLE 1. LIFE HISTORY DATA.

This table gives the duration, in days, of each instar and the total time required for development. Maximum, minimum and average times are given.

	Aver-	Males			Females		
Instar	age	Min.	Max.	Av.	Min.	Max.	Av.
I	21.13	18	24	20.6	18	25	21.3
II	14.10	9	32	13.8	11	20	14.1
III	14.95	12	22	15.9	10	20	14.7
IV	16.83	11	24	17.3	11	24	16.9
V	32.02	23	38	28.9	26	46	33.9
Total	99.51	84	114	96.7	88	118	101.4

A total of 41 individuals were reared through to adults. Of this number 27 or slightly over 65 per cent were females. In the fall of 1934 approximately 80 per cent of the adult specimens collected at Clemson College were females. Perhaps there are normally more females than males produced in this species.

It will be noted from the data above that the males developed in a shorter period of time than the females—the average difference being slightly less than five days. It is interesting to note that the third and fourth instars in the female are shorter than in the male.

Four females reared in captivity deposited eggs during the last part of October and the first part of November. These egg masses were not deposited normally and did not hatch.

Wheel-bugs were collected at Clemson College throughout the summer of 1935 and the stages obtained always corresponded to those under observation, thus demonstrating that development under artificial conditions was synchronous with that occurring in nature.

Further observations were made during the summer of 1936 to verify the results of the previous season. An egg mass which was deposited on October 22, 1935, hatched on April 30, 1936. Individuals were reared to the adult stage from this egg mass in ninety-two (92) days; which confirms the previous season's data.

Under natural conditions the wheel-bug is very vicious in all stages of development. This viciousness was not so pronounced in individuals under observations in cages. It was noted that specimens collected in the field became accustomed to being handled in a very short time.

On June 13, 1935, a wheel-bug nymph was collected in a bean patch at Clemson College feeding on an adult Mexican bean beetle.

A New Race of Oeneis chryxus (Dbld. & Hew.) (Lepidoptera: Satyridae).

By WILLIAM HOVANITZ, University of California, Berkeley

In the summer of 1935 twelve specimens of *Oeneis chryxus* (Dbld. & Hew.) were taken by the author at Sonora Pass, Alpine County, California. A note of this species having been found in the Sierra Nevada was published the same year. However, since that time, the author is of the opinion that these specimens represent a new race for which is proposed the name

OENEIS CHRYXUS **stanislaus** Hovanitz, subsp. nov.

Differing from *Oeneis chryxus chryxus* (Dbld. & Hew.) in: *male*, upper surface, discal cell of primaries totally grey; veins

of primaries lined with black; clear yellow-brown ground color with no black discoloration; one white-centered ocellus between M 1 and M 2 on primaries and one between Cu 1 and Cu 2 on secondaries, in all ocelli the white color being more prominent than the black; under surface, as in *chryxus* except that the ocelli are as above and the line separating the discal from the limbal area on the primaries is continuous from the costal margin to the inner margin. *Female,* as in *Chryxus* except in the character of the ocelli as in male.

Differing from *Oeneis chryxus ivallda* (Mead) in: *male,* ocelli smaller on both upper and lower surfaces of wings; ground color yellow-brown instead of whitish; black lining of veins on upper surface primaries not quite as wide but much wider than *chryxus; female,* nearly identical except that the color is as in male instead of whitish.

The above comparisons are based upon the types but it has been attempted to take characters which are applicable to the entire series and, when necessary, to take only a mean of those which are variable. In the female the ocelli may vary from two to four on the forewing (in the type there is three) while one is constant for the secondaries. Color is fairly constant in both male and female and is as shown in Holland's figures of *gigas* Butl. (Butterfly Book, Pl. 27, f. 1, 2, 1931), only slightly lighter in the females. A greater contrast between the black and white of the under side secondaries than in *chryxus* seems to be constant. A key which to a certain extent will separate these races follows:

Male. I Veins of limbal area of primaries heavily lined with black on upper surface

a. Ground color white or whitish.....*ivallda* [1]

b. Ground color brown or yellow-brown

1. Grey areas of upper side not sharply defined or contrasted with ground color; white spot in ocelli not very prominent, if present .....*chryxus* [2]

2. Great contrast between ground color and grey areas; white spot in ocelli prominent .....*stanislaus*

II Veins of limbal area of primaries only but very little lined with black on upper surface .....*chryxus* [2]

[1] *ivallda* (Mead): Canadian Ent. 10, 196, 1878.

[2] *chryxus* (Dbld. West & Hew.): Gen. Diurn. Lep. 2, 383, 1851.

Keys are rigid while organisms are not and it is to be expected that in categories below a species the former must give way. As a whole, though, the above key should hold true

This race, *stanislaus*, inhabits a life zone below that of *ivallda* which is in the Hudsonian and Arctic-Alpine. Perhaps, though, the Canadian life-zone in which it is found is broken by the cold downward draft from the Leavitt Meadows two thousand feet above and this may be a local race isolated by the Canadian above and below and by unfavorable conditions on either side.

Holotype ♂ Deadman Creek, tributary of the Middle Fork Stanislaus River, border of Tuolumne Co. and Alpine Co. CALIFORNIA. Elevation 8400 feet. July 17, 1935. Placed in the collection of the California Academy of Sciences.

Allotype ♀. Same locality and date and placed in the same collection.

Ten other specimens taken at same locality and date, but not designated paratypes, in the author's collection.

Alleged Designation of Genotypes by Fabricius.

Please allow space for a reference to a discussion of the alleged designation of genotypes by Fabricius. It is in Proc. U. S. Nat. Mus. (1), 1925, pp. 129-131, and is sufficient reply to the article on this subject in ENTOMOLOGICAL NEWS for May, 1937, 48 (5), pp. 130-134. The claims that have been made for Fabrician genotype designations, at least in Rhynchota, are false.

W. L. MCATEE, Biological Survey, U. S. Dept. of Agriculture, Washington, D. C.

Pyrameis virginiensis in France (Lepid.: Nymphalidae).

In the June, 1937, issue of *Lambillionea*, organ of the *Union des Entomologistes Belges*, (xxxvii, p. 144), appeared a short article of interest to American lepidopterists. The author is M. Jean Mauny, of Mortagne-sur-Gironde, Charente-Inferieure, France.

M. Mauny reports that "On the fifth of last October, at a place called l'Echalier, overlooking the Gironde river three kilometers from Mortagne, I captured a very unusual butterfly flying in a field of blooming alfalfa with a great number of *Pyrameis cardui* L. It presents all the external characters of *P. virginiensis* Drury.

"According to Dr. Stichel (Seitz, I, p. 200, Fr. ed.), the native habitat of *virginiensis* is North America, but it has been taken on numerous occasions on the Canary Islands, where it seems to be a native.

"*Cardui* is numbered among those species which have been observed most often in migration, while its habitat is cosmopolitan.

"Although an arrival from North America would seem most improbable, is it not possible to suppose that there occurred a migration from the Canaries, reaching Charente-Inferieure, of *cardui*, among which a few *virginiensis* were mingled?

"On the other hand, could not this specimen be the result of an evolution of *cardui* toward *virginiensis;* or since the two species are assumed to have a common origin, are we not confronted with an example of a return to ancestrial form?"

A third explanation for the presence of our "Hunter's Butterfly" on the west coast of France may be found in the fact that the locality mentioned by M. Mauny is not far from the important and busy port of Bordeaux. Possibly a few chrysalids on produce from America were overlooked by the officials, the imagos of which escaped into the countryside in due course of events and consorted with their cousins, the "Painted Ladies", where they were taken shortly thereafter by our French colleague.

RICHARD M. FOX, Philadelphia, Penna.

Melsheimer Tablet Unveiled at New Holland, Pennsylvania.

Glowing tributes from the fields of science, education and religion were paid to the memory of Rev. Frederick Valentine Melsheimer, Sunday, August 29, 1937, at the unveiling of a memorial tablet to the "father of American Entomology" and the founder of one of the first common schools of Pennsylvania at New Holland.

Approximately 150 persons witnessed the unveiling of the tablet by Mrs. Fisher Ehrehart, of Hanover, great great granddaughter of Rev. Melsheimer.

In presenting the tablet to the borough of New Holland, Dr. Herbert H. Beck, president of the Lancaster County Historical Society, declared "we have been the first to commemorate, honor, revive and perpetuate the memory of Frederick Valen-

tine Melsheimer." Dr. Beck congratulated the New Holland Lions Club for "suggesting and so actively supporting" the plan to erect the tablet.

The memorial, a bronze plaque, 23¾ x 17¾ inches, on a slab of granite, about five feet high, on the lawn in front of the New Holland High School building reads: "Memorial to Frederick Valentine Melsheimer, 1749-1814. Known to science as Father of American Entomology. To religion as Lutheran Pastor Here and Elsewhere. To education as Second President of Franklin College and Founder of a Common School One Block East of This Site in 1787. The Lancaster County Historical Society 1937."

Dr. John A. Schaeffer, president of Franklin and Marshall College, representing the field of education, reviewed the achievements of Rev. Melsheimer as an educator.

Rev. C. G. Bachman, pastor of St. Stephen's Reformed church, New Holland, told the assemblage that while Rev. Melsheimer's fame may rest largely on his contributions to science and education, his life work was in the field of religion. He told of Rev. Melsheimer's thirty-eight years of service in the Lutheran ministry with pastorates at New Holland, Maytown, Manheim, Muddy Creek, Bergstrasse, Strasburg, Annville, Jonestown and Hanover.

Speaking for the field of science, Dr. Stuart W. Frost, Professor of Entomology at Pennsylvania State College, credited Rev. Melsheimer with the "first serious and conscientious study of insects in America." He said that while his was not the first study of that nature in the new continent, his work, begun shortly after moving to New Holland in 1785, has been generally recognized by authorities as outstanding. He said Rev. Melsheimer also is generally credited with outstanding contributions on natural history and mineralogy and that it has been reported that he was the author of a book on astronomy.

Extracts from a paper on Rev. Melsheimer, prepared by M. Luther Heisey, librarian of the Lancaster County Historical Society, were read by J. Paul Kochel, secretary of the New Holland Lions Club.

R. E. Whitmore, of the club and chairman of the committee in charge of the event, accepted the memorial on behalf of the borough.

Vocal selections were given by a quartette.

Lancaster (Penna.) Intelligencer-Journal, August 30, 1937.

Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, Jr.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual volume, and in some cases the part, heft, &c. the latter within ( ) follows; then the pagination follows the colon :

All continued papers, with few exceptions, are recorded only at their first installments.

(*) Papers containing new forms or names not so stated in titles, have an * within parentheses thus (*) following the pagination of reference to paper.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. Titles of papers containing new forms or new names will be indicated by an asterisk within parentheses at end of reference, (*).

Papers published in the Entomological News are not listed.

GENERAL.—Adams J. A.—Temperature preference of the Firebrat, Thermobia domestica (Thysanura). [Iowa St. Coll. Jour. Sci.] 11: 259-265, ill. **Anon.**—Common names of insects. [12] 30: 527-560. **Bird, R. D.**—Records of northward migration of southern insects during drought years. [4] 69: 119-120. **Bishopp, F. C.**—Popularizing entomology. [12] 30: 565-566. **Delong & Davidson**—Methods in study and preservation of leafhopper genitalia. [12] 30: 372-374. **Dove, W. E.**—(see Diptera). **Dow R.**—Brood XI is not extinct yet [Periodical cicada]. [Bull. N. Eng. Mus. N. H.] No. 84: 3-4, **Felt, E. P.**—Dissemination of insects by air currents. [12] 30: 458-461. **Howard, L. O.**—Biographical Notice. By Walton & Bishopp. [10] 39: 121-132, ill. **Howard, L. O.**—Symposium: Insects affecting man. [12] 30: 9-10. **Levereault, P.**—Our morphological terms and interpretations. [19] 32: 51-60, ill. **McLaine, L. S.**—Entomology in relation to industry. [12] 30:1-9. **Marshall & Musgrave**—(See under Lepidoptera.) **Reynolds, J. M.**—A further contribution to the problem of segmentation in the Arthropoda. [Amer. Jour. Sci.] 34: 30-63. **Riley, W. A.**—Scientific approach in insecttherapy. [12] 30: 49-51. **Robinson, W.**—Some therapeutic uses of insects and their products. [12] 30: 41-48. **Snipes, Tauber & Gunderson.**—Two methods of measuring egestion time from large insects. [Iowa St. Coll. Jour. Sci.] 11: 253-257, ill.

ANATOMY, PHYSIOLOGY, ETC.—Bhatia & Keilin.—On a new case of parasitism of snail (Vertigo senesii) by a dipterous larva. [116] 29: 399-408, ill. **Haydak, M. H.**—The influence of a pure carbohydrate diet on newly emerged honeybees. [7] 30: 258-262. **Headlee, T. J.**—Some facts underlying the attraction of mosquitoes to sources of radiant energy. [12] 30: 309-312. **Howland & Glancy.**—The effect of compression on bristle growth in wild-type self-implants of Drosophila melanogaster. [90] 71: 429-430, ill. **Mathur & Soni.**—Studies on Schistocerca gregaria. IX. Some observations on the histology of the blood of the desert locust. [Indian Jour. Agr. Res.] 7: 317-326, ill. **Murray, J. A.**—Technique for paraffin sections of formal-fixed insect material. [Jour. R. Micro. Soc.] 57: 15. **Pruthi, H. S.**—Biology of the desert locust Schistocerca gregaria. [Current Science] 5: 608-609. **Querci, O.**—Effects of radiant heat on the development of some butterflies. [21] 49: 73-76. **Roonwal, L. M.**—Studies on the embryology of the African migratory locust, Locusta migratoria migratorioides. II. Organogeny. [Phil. Trans. R. Soc. London] (B) 227: 175-244, ill. **Salt, R. W.**—Studies on the freezing process in insects. [Univ. Minnesota Agr. Exp. Sta.] Tech. Bull. 116: 3-41, ill. **Scott, E. A.**—The eyes of insects and their adaptation to habit and environment. [13] 29: 33-44, ill. **Snipes & Tauber.**—Time required for food passage through the alimentary tract of the cockroach, Periplaneta americana. [7] 30: 277-284, ill. **Wolsky, A. A.**—Production of local depressions in the development of Drosophila pupae [31] 139: 1069-1070, ill. **Wray, D. L.**—The embryology of Calendra callosa the southern corn billbug (Rhynchophor.). [7] 30: 361-409, ill.

ARACHNIDA AND MYRIOPODA—Bishopp & Smith.—A n. sp. of Ixodes from Massachusetts. [10] 39: 133-138, ill. **Chamberlin & Ivie.**—New spiders of the family Agelenidae from western North America. [7] 30: 211-241, ill. **da Fonseca, F.**—Notas de Acareologia. XVIII. Generos e especies de acarianos parasitos de ratos. XIX. Generos e especies de acarianos parasitas de mammiferos. XX. Especies de acarianos do genero Laelaps, parasitas de ratos do Brasil. XXI. Gymnandromorphismo em Amblyomma cajennense. XXII. Liponissus haematophagus sp. n. XXIII. Novas especies de Trombiculinae dos generos Trombicula, Hannemania e Neoschongastia. XXIV-A. Representante

brasileiro do genero Dermanyssus. (B) Nota sobre o nome generico Paralaelaps [73] 10: 17-23; 25-32; 33-37; 39-41; 43-46; 47-50; 51-59; ill. **Fox, I.**—Notes on North American lycosid spiders. [10] 39: 112-115, ill. **Gertsch, W. J.**—New American spiders. [40] No. 936: 7pp., ill. **Jacot, A. P.**—Six new mites from Western North Carolina. [10] 39: 163-166. **de Mello-Leiato, C.**—Novos Licosidas do Brasil. [Ann. Acad. Brasileira Sci.] 9: 87-90, ill. (*). **Parker, Philip, Davis & Cooley.**—Ticks of the United States in relation to disease in man. [12] 30: 51-69.

THE SMALLER ORDERS OF INSECTS—Folsom, J. W.—Nearctic Collembola or springtails of the family Isotomidae. [U. S. N. M.] Bull. 168: 104pp., ill. (*). **Kennedy, C. H.**—Perilestes castor and P. pollux new dragonflies from Ecuador, with notes on P. kahli. (Lestidae). Staurophlebia auca, a new dragonfly from Ecuador (Aeshnidae). [7] 30: 410-424; 425-430, ill. **Werneck, F. L.**—Notas para o estudo da ordens Mallophaga. [Mem. Inst. Oswaldo Cruz] 32: 13-28, ill. (*). Nova especie do genero Cummingsia (Mallophaga: Trimenopon.). [Mem. Inst. Oswaldo Cruz] 32: 69-73, ill. Sobre uma segunda especie do genero Monothroaicus (Mallophaga: Gyrop.). [Mem. Inst. Oswaldo Cruz] 32: 105-109, ill. (*). Nota sobre Pediculus mjobergi (Pedicul.). [Mem. Inst. Oswaldo Cruz] 32: 161-163.

ORTHOPTERA—Fulton, B. B.—Experimental crossing of s. sps. in Nemobius (Gryll.) [7] 30: 201-207, ill. **Gurney, A. B.**—Studies in certain genera of American Blattidae. [10] 39: 101-112, ill. **Mills & Pepper.**—Observations on Grylloblatta campodeiformis. [7] 30: 269-275, ill.

HEMIPTERA—Cory & Knight.—Observations on Brood X of the periodical cicada in Maryland. [12] 30: 287-294. **Bruner & Barber.**—Additional notes on Cuban Reduviidae. [115] 11: 181-190. **Drews & Sampson.**—A n. sp. of aphid from California. [13] 29: 29-30, ill. **Flanders, S. E.**—Ovipositional instincts and developmental sex differences in the genus Coccophagus. [67] 6: 403-422, ill. **James, H. C.**—On the pre-adult instars of Pseudococcus longispinus with special reference to characters of possible generic significance. [36] 86: 73-84, ill. **Knowlton & Allen.**—Bramble fruit aphids. [7] 30: 309-316, ill. (*). **Mason, P. W.**—A new root aphid (Aphiidae). [10] 39: 166-167, ill. **McKenzie, H. L.**—Morphological differences distinguish-

ing California red scale, yellow scale, and related species (Diaspid.). [67] 6: 323-336, ill. **Miller, F. W.**—Two new aphids from Massachusetts [4] 69: 111-113, ill. **Pletsch, D. J.**—Improved device for artificial feeding of aphids. [12] 30: 211-212. **Wheeler, N. H.**—Trap-light studies on leafhoppers belonging to the genus Empoasca (Cicadell.), with the descr. of two n. sp. [10] 39: 141-156, ill.

LEPIDOPTERA—Barber, G. W.—Seasonal availability of food plants of two sp. of Heliothis in eastern Georgia. [12] 30: 150-158, ill. **Bell, E. L.**—A new species of Hesperidae and notes on others from Panama. [40] No. 938: 7pp., ill. **Clark & Clark.**—Preliminary list of the butterflies of Virginia. [95] 50: 87-92. **Doudoroff, M.**—Notes on Californian Euphydryas species. [4] 69: 117-119. **Hayward, K. J.**—Argentine notes. I. Papilionidae. [21] 49: 77-80. **Hoffman, F.**—Beitrage zur Lepidopterenfauna von Sta. Catharina. [17] 54: 456-457, cont. **Keifer, H. H.**—California Microlepidoptera XI. [Bull. Dept. Agric. Calif.] 26: 177-203, ill. **Lichy, R.**—Mesothen erythaema (Syntom.). [Bol. Soc. Venez. Cien. Nat.] 3: 390-391, ill. **McAlpine, W. S.**—A case of mistaken identity and discovery of a new metal mark (Calephelis from Michigan (Rhiodin). [19] 32: 43-49, ill. **McAlpine, W. S.**—Calephelis louisiana synonymous with Calephelis virginensis. [19] 32: 76. **Marshall & Musgrave.**—A progress report on the Microlepidoptera of southern Indiana, and their parasites. [4] 69: 100-106. **Newcomb, H. H.**—Notes on Basilarchia astyanax albofasciata. [19] 32: 75-76. **Powell, D.**—New technic for hatching codling moth eggs. [12] 30: 563-564. **Walkden, H. H.**—Noctuidae taken at a bait trap in Kansas. [7] 30: 296-303.

DIPTERA—Alexander, C. P.—New or little-known Tipulidae from tropical America. [56] 16: 55-66. **Alexander, C. P.**—Change of name in diptera. [19] 32: 60. **Bussart, J. E.**—The bionomics of Chaetophelps setosa (Tachin.). [7] 30: 285-295, ill. **Collin, J. E.**—On a collection of Diptera from East Greenland. [75] 19: 594-595. **Curran, C. H.**—The neotropical species of Melanostoma and allies. (Syrph.) [40] No. 926: 4 pp. **Dove, W. E.**—Myiasis of man. [12] 30: 29-39. **da Fonseca F.**—Nota sobre uma especie de Flebotomus do Brasil. [73] 10: 61-62. **King & Bradley.**—Notes on Culex erraticus and related species in the United States. [7] 30: 345-357, ill. **Knipling, E. F.**—The biology of Sarcophaga cistudinis, a sp. of Sarcophagidae parasitic

on turtles and tortoises. [10] 39: 91-101, ill. **Komp, W. H. W.**—Notes on the identification of Anopheles pseudopunctipennis (Culic.). [10] 39: 157-163, ill. **Komp, W. H. W.**—Anopheles acanthotorynus, a n. sp. of the s. g. Stethomyia from Peru. [7] 30: 358-360, ill. **Reinhard, H. J.**—New North American muscoid diptera. [19] 32: 62-74. **Williams, L. L. Jr.**—Mosquitoes and malaria. [12] 30: 20-26.

COLEOPTERA—Andre, F.—Studies on brood A. June beetles in Iowa. [Iowa St. Coll. Jour. Sci.] 11: 267-280. **Basilewsky, P.**—Description de deux Carabus nouveaux de l'Alaska. [25] 42: 63. **Bierig, A.**—Nuevos Staphylinini Neotropicales. [115] 11: 191-205, ill. **Bissell, T. L.**— Structure of the reproductive system of the pecan weevil (Curculion.) [7] 30: 242-251, ill. **Blaisdell, F. E.**—Miscellaneous studies in the Coleoptera. No. 5. (Tenebrionidae and Melyridae). [1] 63: 127-145. (*). **Bottimer, L. J.**—Some notes on Bruchus brachialis. [12] 30: 379. **Brown, W. J.**—The Coleoptera of Canada's eastern Arctic. [4] 69: 106-111. (*). **da Costa Lima, A.**—Especies de Psyllobora (Coccinell.). [Mem. Inst. Oswaldo Cruz] 32: 12pp., ill. (*). **Darlington, P. J.**—The West Indian species of Osorius (Staphylin.) [Bull. Mus. Comp. Zool.] 80: 283-301. (*). **Hinton, H. E.**—Descriptions and figures of new Peruvian Dryopidae. [9] 70: 131-138, ill. (*). Helichus immsi, sp. n. and notes on other North American sp. of the genus. (Dryop.) [7] 30: 317-323, ill. **Jeannel, R.**—Les Bembidiides endoges. [Rev. Francaise d'Ent.] 3: 241-402, ill. Nouveaux Trechinae de l'Afrique et de l'Amerique du Sud (Carabidae). [25] 42: 99-102, ill. **Knull, J. N.**—New sp. of Faratyndaris with notes on described forms. (Buprest.). [7] 30: 252-257, ill. **Moore, I.**—A list of the beetles of San Diego Co. Calif. [Occ. Pap. San Diego Soc. N. H.] 2: 109 pp. **Murillo, L. M.**—Conceptos generales sobre la entomologia economica y los servicios de sanidad vegetal en el pais. [Rev. Acad. Colombiana Cien. Ex., Fis. y Nat.] 1: 21-23, ill. **Ray, E.**—Synopsis of the Puerto Rican beetles of the genus Mordellistena, with descr. of n. sp. [50] 84: 389-399, ill.

HYMENOPTERA—Aguayo, C. G.—Nueva especie de Hormiga cubana. [115] 11: 235-236, ill. (*) **Ainslie, C. N.**—Notes on the biology of two panurgine bees. [4] 69:97-100. **Barber, G. W.**—Variation in populations and in size

of adults of Trichogramma minutum emerging from eggs of Heliothis obsoleta. [7] 30: 263-268. **Cendana, S. M.**—Studies on the biology of Coccophagus a genus parasitic on nondiaspidine Coccidae. [67] 6: 337-399, ill. **Cockerell, T. D. A.**—South American bees. [40] No. 928: 2pp. (*). **Flanders, S. E.**—Habitat selection by Trichogramma. [7] 30: 208-210. Notes on the life history and anatomy of Trichogramma. [7] 30: 304-308, ill. **MacDonagh, E. J.**—Sobre Hormigas podadoras del extremo sur de Buenos Aires. [Notas del Museo de la Plata] 2: 45-52, ill. **Merisuo, A. K.**—Myrmekofiiliseula. [Ann. Ent. Fennici] 3: 98-102, ill. **Muesebeck, C. F. W.**—A new West Indian sp. of Mirax, parasitic on the coffee leaf-miner (Braconidae). [10] 39: 139-141, ill. **Pate, V. S. L.**—Studies in the Pemphredonine wasps (Sphecidae). New genera and species of the ammoplanoid complex. [1] 63: 89-125, ill. **Rau, P.**—The life-history of Osmia lignaria and O. cordata, with notes on O. conjuncta. [7] 30: 324-343, ill. A note on nest-founding in the bumblebee, Bremus americanorum. [19] 32: 61. **Richards, O. W.**—Results of the Oxford University Expedition to British Guiana, 1929. Hymenoptera, Sphecidae and Bembecidae. [36] 86: 101-118, ill. **Santschi, F.**—Les sexues du genre Anillidris. [25] 42: 68-70, ill. (S). **Servadei, A.**—Contributi alla conoscenza dei Tentredinidi (Symphyta) delle Rose. [Redia] 22: 97-129, ill. **Walley, G. S.**—Notes on the types of some Ichneumonidae described by Provancher. [4] 69: 115-117. **Wheeler, W. M.**—Ants mostly from the mountains of Cuba. [Bull. Mus. Comp. Zool.] 81: 441-465. (*).

SPECIAL NOTICES.—Bibliotheca Zoologica Fenniae. Opera annorum 1901-1930. Par H. Lindberg. [Acta pro. Fauna et Flora Fennica]. 59: 438. **Code universal** des couleurs. Par E. Seguy. Paul Lechevalier, Paris. Small octavo containing 48 plates showing 720 colors. **Fauna of British India**—including Ceylon and Burma. Moths Vol. 5. Sphingidae. By Bell and Scott. 537 pp., ill. **Monograph of the** British Neuroptera. By J. F. Killington. Vol. II. 306 pp., ill. London, 1937. **Monographie der Europaischen** Arten der Gattung Cryptophagus. von N. Bruce. [Acta Zool. Fennica] 20: 167 pp., ill. **Notes on Ceratopogonidae** (Diptera). By J. W. S. Macfie. [107] 6: 111-118. **Revision der tribus** Ophionini (Ichneumonidae). By N. F. Meyer. [56] 16: 15-24.

PROCEEDINGS OF THE TWENTY-FOURTH ANNUAL MEETING OF THE NEW JERSEY MOSQUITO EXTERMINATION ASSOCIATION, held at Atlantic City, New Jersey, March 17, 18 and 19, 1937. New Brunswick, N. J., 239 pp., many figures.—These proceedings present much practical information and considerable scientific data of interest to mosquito workers. Discussions of the papers are enlightening and afford an opportunity to learn of experiences elsewhere and of modifications of established mosquito control principles employed over a wide variety of sections. Mosquito control workers can ill afford not to peruse the present issue. Past copies should prove valuable as references. An interesting topic presented is the protection from mosquitoes at outdoor meetings, an activity which would popularize any mosquito control campaign by affording temporary protection to outdoor public gatherings. Such protection would be especially valuable in demonstrating the desirability of mosquito-free environments. A summary is given of work on mosquitoes throughout the world and should prove a boon to the busy worker who has little time to peruse the literature. Much contained in the summary is not available elsewhere, having been gathered direct by letter. Valuable information is presented on directions for applying mosquito repellents for protection of outdoor gatherings; on the relation of mosquito prevalence to human comfort; the successful use of publicity in mosquito control campaigns; new and significant mosquito control developments in this country during 1936; the effect of rainfall on mosquito prevalence; studies of mass mosquito migration across open bodies of water; relation of mosquito control work to conservation activities, and other equally important subjects.—J. LYNNE ROBERTSON, JR., P. A. Sanitary Engineer, Malaria Investigations, United States Public Health Service.

THE BIOLOGICAL CONTROL OF INSECTS. With a Chapter on Weed Control. By HARVEY L. SWEETMAN, Assistant Professor of Entomology, Massachusetts State College. With a Foreword by L. O. HOWARD. Ithaca, New York, Comstock Publishing Co., Inc., 1936. Pp. xii, 461, 142 text-figs. and also portraits of Doctors L. O. Howard (frontispiece), W. R. Thompson, A. Paillot, H. S. Smith, C. P. Clausen and F. A. G. Muir. $3.75—This is an important ecological and entomological book, dealing both with the pure and the applied (economic) phases of its subjects. Chapter I considers the theoretical basis of biological control, Chapter II the resistance of plant hosts, Chapters III-V and XII the non-insectan enemies of insects,

viz.: bacteria, fungi, viruses, protozoa, nemathelminthes and vertebrates. Chapters VI-XI and XIII, 227 pages, or nearly half the book, are concerned with insects and arachnids attacking insects. The final chapter, XIV, treats of the biological control of pest plants. There is a glossary of 5¼ pages, of terms not defined in the text. The list of references to literature, pp. 390-420, is arranged in 14 sections, corresponding to the chapters, the authors cited arranged alphabetically in each section; we wonder why a single alphabetical list for the whole book would not be more convenient. The index is extensive, 41 pages.

We share Dr. Howard's marvel "at the knowledge and industry of the writer, at his grasp of the big subject, and at his careful weighing of the facts and evidences." The information on parasitic insects is widely scattered and the way it is brought together in this book will be of the greatest help to all who wish to become acquainted with it. Attention is given in the first chapter to definitions of terms and the forms adopted are not always those in wide use. The author sums up his results by saying "The major revision under the above definitions is to remove the forms variously called occasional, transitory, erratic and temporary parasites from the field of parasites and to classify them as predators" (p. 11). So many and important are the topics discussed in this book that it would require much more space than is here available to merely mention them. Of general interest is Chapter IX, Some Biological Relations of Insect Parasites and Predators to their Hosts, dealing with host selection and specificity, parasitism versus predatism, types of life cycle of parasitic insects, development of endoparasites and behavior of adult parasites. With the author's conclusion that, "Actually there appears to be relatively little difference in the specificity of parasites and predators," we must stop, congratulating him and his readers on his most valuable work.—P. P. CALVERT.

HOW TO KNOW THE INSECTS. An illustrated key to the more common families of insects, with suggestions for collecting, mounting and studying them. By H. E. JAQUES, Professor of Biology, Iowa Wesleyan College. Biological Survey Publication No. 1, Iowa Academy of Science. Planigraphed by John S. Swift Co., Inc., Pp. iv, 140, 251 figs. To be obtained from the author at 709 North Main, Mt. Pleasant, Iowa. Cloth $1.80, spiral and side staple binding $1.00.—A clear, well-arranged little book, 8½ x 5½ inches, dealing with

the place and development of insects (7 pp.), directions for collecting and mounting them (25 pp.), keys to 25 orders (17 pp.), and to about 154 families of the Odonata, Orthoptera, Coleoptera, Hemiptera, Homoptera, Neuroptera, Lepidoptera, Diptera and Hymenoptera (65 pp.) At least one representative of each family is figured. There is a couple of pages on the Iowa Insect Survey, a list of orders and families, often with the number of known Iowa species added for each family, and an index and glossary. A useful manual for the beginner.—P. P. CALVERT.

ANIMAL COMMUNITIES IN TEMPERATE AMERICA as illustrated in the Chicago Region. A Study in Animal Ecology. By VICTOR E. SHELFORD, The University of Illinois. Second edition May, 1937. The Geographic Society of Chicago Bulletin No. 5. Published for the Society by The University of Chicago Press, Chicago, Illinois. Pp. xiii, 368, 306 figs., 9 diagrams. $3.00.—A review of the first edition of this book was published in the NEWS for February, 1914, pp. 82-85. The preface to this second impression states: "The second impression of this book is unchanged excepting for the correction of typographical and clerical errors. An annotated Bibliographical Appendix [pp. 337-344] has been added which will enable the reader to go on with the subject. The community nomenclature has changed materjally in the twenty-five years which have elapsed since the book was written. These changes are, however, not so serious and it has been possible to provide for the correction of them in a table [p. 337]. These corrections were previously published in the journal *Ecology*. The taxonomic nomenclature has been left in the original form." We have not compared the present edition with the first, page for page, but we refer interested readers to our preceding review. —P. P. CALVERT.

A MONOGRAPH OF THE BRITISH NEUROPTERA by FREDERICK JAMES KILLINGTON, Editor of the Transactions and Journal of the Society for British Entomology. Vol. II, pp. xii, 306, pls. 16-30, text figs. 69-115. Printed for the Ray Society, sold by B. Quaritch, Ltd., 11 Grafton St., New Bond St., London, W. I. This volume (No. 123 of the Series, is issued to the subscribers to the Ray Society for the year 1936. Price 25 shillings.—Volume I of this work was noticed in the NEWS for October, 1936, pp. 226-227. Volume II continues the systematic account begun in Volume I, chapter 6, and deals with

6 genera and 24 species of Hemerobiidae and 2 genera, 14 species, of Chrysopidae, pp. 1-246. At least some description of the early stages of 19 of the species of Hemerobiidae and of all the 14 species of Chrysopidae is given. Appendix A gives directions for collecting, preserving and rearing these insects, pp. 247-252. Appendix B, pp. 253-256, transfers the five British species, which in the body of the work were referred to *Boriomyia* Banks, to a new genus *Kimminsia*, while *Boromyia* Banks, 1904, is regarded as valid, instead of *Boriomyia* Banks, 1906, necessitating a new fixation of type for *Boromyia* (*fidelis* Banks, one of the included species in 1904, instead of *disjunctus* Banks, type fixed in 1906, but not included in 1904). *Allotomyia* Banks, 1930, thus becomes a synonym of *Boriomyia* Banks, 1904. Corrigenda and Addenda occupy pp. 257-259, the bibliography pp. 260-291 and the Index to the two volumes pp. 293-306.—P. P. CALVERT.

Seventh International Congress for Entomology, Berlin, 1938.

By Resolution adopted by the Executive Committee for International Congresses for Entomology, the SEVENTH INTERNATIONAL CONGRESS FOR ENTOMOLOGY will convene in Berlin, from August 15th to 20th, 1938.

Discussions will be held in the following sections and on the subjects indicated below:

A. General Entomology:

(1) Systematics and Zoogeography, (2) Nomenclature and Bibliography, (3) Morphology, Physiology, Embryology and Genetics, (4) Ecology.

B. Applied Entomology:

(1) Medical and Veterinary-medical Entomology, (2) Agriculture and Sericulture, (3) Forest Entomology, (4) Agricultural Entomology (a) Viticulture and Pomiculture, (b) Agriculture and Olericulture, (c) Vermin; (5) Means and methods for fighting vermin.

The Management of the Congress would deeply appreciate the participation of numerous Representatives of Scientific and Practical Entomology in the Congress to be convened in Berlin. All entries for participation, and all inquiries, should be addressed to the Secretary-General, Professor Dr. Martin Hering, Invalidenstrasse 43, Berlin N. 4, Germany.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being ongest in) are discontinued.

Wanted.—Communication with anyone who has or is collecting Lepidoptera in Burlington County, New Jersey Also anyone having a microscope for sale.—E. P. Darlington, New Lisbon, N. J.

Wanted for Cash or Exchange. — North American Butterflies in series especially from type localities and remote places. C. F. dos Passos, Mendham, New Jersey.

Wanted—Collectors desiring living pupae with cocoon attached to natural food plant of Michigan, Samia, Columbia or hybrid with S. Cecropia, write W. S. McAlpine, 575 Townsend St., Birmingham, Mich.

Wanted—North American Chrysididae for exchange or determination, with privilege of retaining duplicates. W. G. Bodenstein, Department of Entomology, Cornell University, Ithaca, New York.

Wanted—Chloropidae (Oscinidae) of the world. Study, determination or exchange. C. W. Sabrosky, Entomology Dept., Michigan State College, East Lansing, Mich.

Wanted — Heliconia from various parts of Mexico, Central and South America, especially Bolivia. Buy or exchange. F. E. Church, 15 West 67th St., New York, N. Y.

Wanted—Chrysalids of Papilio ajax and philenor, cocoons of Rothschildia orizaba and jorulla. Buy or exchange. Newark Entomological Society. Curator, Chas. Rummel, Green Village Rd., R. D. 2, Madison, New Jersey.

Have large list of Lepidoptera wants and offers. Send me yours. Carpenter, Box 1344, Hartford, Conn.

Wanted — Specimens of North American **Cephidae.** Will make determinations and exchanges for purposes of revising the group. Donald T. Ries, Department of Entomology, Cornell University, Ithaca, N. Y.

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